

What Is Claimed Is:

1. A plasma generation apparatus comprising:

a vacuum vessel having a plasma generation region established in the interior thereof;

5 gas induction means for inducting discharge gas into said interior of said vacuum vessel;

exhaust means for exhausting the atmosphere in the in the interior of said vacuum vessel;

10 a cylindrical discharge electrode fashioned so as to enclose said plasma generation region;

first high-frequency electric power application means for applying high-frequency electric power to said discharge electrode;

15 magnetic force line formation means for forming magnetic force lines having portions roughly parallel to center axis of said discharge electrode, such that the length of said parallel portions becomes longer the closer said magnetic force lines are to said center axis; and

20 two walls positioned so as to sandwich said plasma generation region between them, in dimension of said center axis of said discharge electrode, for defining the scope of said plasma generation region in said center axial dimension; wherein

said magnetic force lines that pass through center of said plasma generation region are shaped so that they do not intersect said two walls.

2. The plasma generation apparatus according to Claim 1, wherein said two walls are formed of a material exhibiting electrical conductivity.

25 3. The plasma generation apparatus according to Claim 2, comprising second high-frequency electric power application means for applying high-frequency electric power to one of said two walls.

4. The plasma generation apparatus according to Claim 3, wherein the other of said two walls is connected to a reference potential point.
5. The plasma generation apparatus according to Claim 3, wherein the other of said two walls is established in an electrically floating state.
- 5 6. The plasma generation apparatus according to Claim 4 or 5, wherein, when said plasma is used in subjecting objects to be treated to prescribed treatments, the other of said two walls is used as a holder for holding said objects to be treated.
7. The plasma generation apparatus according to Claim 3, wherein said  
10 first high-frequency electric power application means comprises a first high-frequency electric power supply for outputting said high-frequency electric power applied to said discharge electrode and said second high-frequency electric power application means comprises a second high-frequency electric power supply for outputting said high-frequency electric power applied to  
15 one of said two walls.
8. The plasma generation apparatus according to Claim 3, wherein said  
first high-frequency electric power application means comprises a high-frequency power supply for outputting the high-frequency electric power applied to said discharge electrode ; and said second high-frequency electric  
20 power application means comprises a high-frequency resonant circuit for resonating with the high-frequency electric power output from said high-frequency electric power supply.
9. The plasma generation apparatus according to Claim 2, wherein both of said two walls are connected to a reference potential point.
- 25 10. The plasma generation apparatus according to Claim 1, comprising control means for controlling magnitude of high-frequency electric power applied to said discharge electrode from said first high-frequency electric

power application means.

11. The plasma generation apparatus according to Claim 7, comprising ~~control means for controlling~~ <sup>a controller that controls</sup> magnitude of high-frequency electric power output from said first and second high-frequency electric power supplies.

12. The plasma generation apparatus according to Claim 11, wherein said ~~control means are~~ <sup>controller is</sup> configured so that, when controlling magnitudes of high-frequency electric power output from said first and second high-frequency electric power supplies, ~~effect said control so that~~ the ratio between them is always a predetermined value.

13. The plasma generation apparatus according to Claim 8, comprising ~~control means for controlling~~ <sup>a controller that controls</sup> magnitude of high-frequency electric power output from said high-frequency electric power supply.

14. The plasma generation apparatus according to Claim 1, comprising ~~position adjustment means for adjusting~~ <sup>positions adjuster that adjusts</sup> positions of said two walls in dimension of center axis of said discharge electrode.

15. The plasma generation apparatus according to Claim 1, wherein one of said two walls is used as a gas diffusion plate for diffusing said discharge gas in said plasma generation region, and the other of said two walls, when said plasma is used in subjecting objects being treated to prescribed treatments, is used as a holder for holding said objects being treated.

16. A plasma generation apparatus comprising:  
a vacuum vessel having a plasma generation region established in the interior thereof;

gas induction means for inducting discharge gas into said interior of said vacuum vessel;

exhaust means for exhausting the atmosphere in the interior of said vacuum vessel;

a cylindrical discharge electrode fashioned so as to enclose said plasma generation region;

first high-frequency power application means for applying high-frequency electric power to said discharge electrode;

3 magnetic force line forming means that form magnetic force in said plasma generation region;

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two walls, formed of a substance exhibiting electrical conductivity, and positioned so as to sandwich said plasma generation region between them, in dimension of said center axis of said discharge electrode, for defining the

10 scope of said plasma generation region in said center axial dimension; and second high-frequency electric power application means for applying high-frequency electric power to one of said two walls.

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